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ABSTRACT

This document offers additional guidelines for school facilities in California in the areas of safety and security, lighting, and cleanliness. It also offers a description of technology resources available on the World Wide Web. On the topic of safety and security, the document offers guidelines in the areas of entrances, doors, and controlled access to campuses; windows; visibility; traffic patterns and parking areas; play and sports areas; landscaping; fencing and gates; exterior lighting; lavatories; environmental design features; visitor control and access; and specialized sites. An extensive list of related resources is also provided. Regarding lighting standards, the document offers research-based design recommendations and suggestions concerning reflectances, fixture brightness, ceiling height, excess wall luminance (windows), nonuniformity of illumination (general lighting), and energy conservation. This section also includes a glossary. The section on clean school standards offers questions to consider when establishing policies for a maintenance and operations program. Finally, the section on technology resources includes Web sites on comprehensive technology planning, integration of technology into the curriculum, and staff development. (EV)

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The following information is provided as an addendum to the guidelines developed for *SafeSchool Plans* and closed campuses by the California Department of Education's School Safety and Violence Prevention Office. This information is designed specifically to address the configuration of facilities, new construction, and the retrofitting of existing buildings to provide a safe and secure environment.

The Challenge of Providing Safe and Secure Facilities

The explosive growth in California's school population is having a dramatic impact on safety in school facilities. Without sufficient funding to meet enrollment growth through the construction of new facilities, local school districts depend on portable buildings that encroach on play areas and tax the capacity of school services and areas, such as cafeterias, bathrooms, libraries, transportation, and security. These overcrowding situations negatively impact educational programs in California, which already has the highest student-to-teacher ratios in the nation. In addition, many schools are old and outdated, and improving conditions is often complicated by a lack of understanding as to how to provide a safe facility. Consider the following:

- The California student population is estimated to increase by approximately 140,000 students per year through the year 2000, according to California Department of Finance estimates.

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- There is a backlog of demand for new school space based on the growing student population. Current estimates show that California will need to spend $15 billion for the construction of new K–12 school facilities. California would need to build almost 22,000 classrooms, or 12 new classrooms per day, to keep up with the demand. Between now and the year 2000, approximately 800 new K–8 schools and more than 100 new high schools will be needed.
- More than half of over 50,000 buildings maintained by California school districts on 7,800 campuses are 35–40 years old. It is estimated that they need $1.75 billion in deferred maintenance and an additional $1.55 billion per year for modernization.

School Safety—A Top Priority

Students who fear for their safety are not free to learn; teachers who fear for their safety cannot freely teach. Ensuring their safety is one of the highest priorities for schools. It is imperative for administrators, teachers, parents, police, and the community to work together to create a climate of safety in schools. There are four key reasons why school safety is a top priority:

1. **Educational.** Schools are created to provide a learning environment that allows teachers to effectively teach and students to actively learn. Crime and violence occurring on or around a school campus significantly interfere with providing such an environment.
2. **Legal.** Schools are required to provide equal education to all students. Students who are too frightened to attend school or are preoccupied with their safety while in class are not realizing their right to education. Furthermore, equal access to quality education is not provided to students who must attend schools located in high-crime communities.

The National Education Association calculates that on any given day about 160,000 students stay home because of fear of violence in or on the way to school. Indeed, their fear may be warranted: Firearms are the fourth leading cause of accidental death among children between the ages of five and fourteen, according to Craig Sautter in "Standing Up to Violence: A Kappan Special Report," in *Phi Delta Kappan* (January, 1995).

3. **Social.** Schools are unique as the only entity in society that can positively affect every student in our nation regardless of potentially negative social influences. Schools can develop programs that improve conditions and give every student a chance to reach her or his full potential.
4. **Financial.** Schools are responsible for managing public resources. Preventing youth violence ensures that a majority of resources go to the classroom as opposed to such things as graffiti removal and vandalism repair. The costs of crime and vandalism are extensive and compelling; they include:
   - —Costs of additional school police
   - —Costs of lost equipment to theft
   - —Costs of graffiti removal and repair of damage
   - —Dollars used to contract with local police departments for services
   - —Costs associated with "down time" when students are diverted from educational purposes because of bomb threats, fights, and so forth
   - —Costs of security measures such as alarm systems
   - —Due-process costs associated with expulsions, truancy, and so on
   - —Increased secretarial time resulting from mandatory reporting laws

In California school property losses approach $250 million annually. A 20 percent reduction in the costs of violence and vandalism in each of California's 7,800 campuses would dramatically improve the state's ability to meet the needs of California's growing student population.

Designing or Retrofitting a School for Safety

When planning for school safety, the school-community team must consider three design stages:

1. Construction of new buildings
2. Retrofitting of old buildings
3. Addition of portable buildings

Many of the following suggestions about protecting property apply to all three design stages. The California Department of Education's School Facilities Planning Division and the State

Architect are invaluable resources as districts design new facilities or retrofit old ones. They can help schools keep apprised of the latest information about environmental design and safety features. It is important to consider the following:

- Student enrollment growth is likely to occur between the time the construction plans are approved and the building is completed. It is wise to plan where portable classroom units could be located when needed.
- Supervision needs can be anticipated in the building design. Campus buildings, play areas, and parking lots should be arranged to create a sense of security and allow for supervision of the greatest portion of the campus with the fewest number of individuals. Care must be given to avoid creation of easy access to hiding places. Recesses in or between buildings can hide vandals.
- Monitoring devices and communications equipment should, when possible, be included in the design. Consider:
  - —Energy, lighting, and alarm systems that are controlled by computer from the district office
  - —Closed-circuit television and public address systems
  - —Two-way communications to each class and storage area
- Traffic patterns and parking areas can pose major safety hazards. Avoid dangerous vehicular circulation, potential pedestrian-vehicle conflicts, and parking areas that provide easy access to vandals.
- Placement of emergency equipment, utilities, gas mains, and so forth is a major design consideration; they must be inaccessible to vandals but easily reached for shut-off by emergency crews. Convenient vehicle access around buildings for nighttime surveillance and fire access should be provided.

The following considerations might be useful in designing a new school or in retrofitting an existing school. It should be emphasized that these considerations represent "the best of all worlds" and may not be completely attainable because of budget and time constraints; however, awareness of these suggestions should play an important part in planning and budgeting for future projects.

Entrances, doors, and controlled access to campuses

- Building access requirements should be carefully evaluated. The fewer doors—especially those equipped with lock sets—the fewer security problems that could arise. Doors that are

key-controlled should be equipped with contacts for alarm installation purposes.

- Exterior exit doors do not need handles and locks on the outside.
- Doors should be constructed of steel, aluminum alloy, or solid-core hardwood. If necessary, glass doors should be fully framed and equipped with burglar-resistant tempered glass.
- Double doors should be secured with heavy-duty, multiple-point, long flush bolts.
- All exit doors with panic push-bars should also be equipped with deadbolt locks to prevent easy exit by criminals or vandals.
- There should be no recessed doorways.
- Interior doors should be equipped to prevent criminals or vandals from locking hall doors from inside a classroom or office in order to slow down security officers' pursuit.
- Door hinges should have nonremovable pins to prevent burglaries.
- Locks should be placed on all doors to high-risk areas, such as computer labs.
- There should be no surface-mounted locks or locks having knob-mounted key access.
- Exterior doors should have as little exposed hardware as possible.
- If lever handles are required, recurve handles can be used or pulls can be installed that are designed to reduce access by persons using pry-bars.
- Door frames should be constructed of pry-proof metal.
- There are newer squeeze-bar units, referred to as "panic hardware," which have no exposed bar to pry or bend. These units should be the flush-mounted push type. Panic bars should be protected by "pick plates," easily installed door security devices that can prevent tools and plastic cards from releasing the bolt.
- Heavy-duty mullions (vertical strips dividing panes or windows) or astragals (narrow moldings) can be used on the inside of double doors.
- Exterior swinging doors should have a minimum 1-inch deadbolt lock with a 1-inch throwbolt with a hardened steel insert, a free-turning steel or brass tapered guard, and double-cylinder locks if glass is located within 40 inches of the locking mechanism.

- The armored strike plate should be securely fastened to the door frame in direct alignment to receive the latch easily.
- Attractive, sturdy kickplates can be used to minimize damage to doors.
- Heavy-duty metal or solid-core wooden doors should be used at entrances to areas containing expensive items. These areas include classrooms, storerooms, and custodians' rooms. Interior doorway doors should also be heavy-duty metal or solid-core wooden doors.

Windows

- Replacement of broken windows is one the highest vandalism costs. Carefully consider the location, size, and necessity of windows.
- Windows should not be placed lower than 3 feet from the floor unless they are protected in some manner from active feet.
- If possible, ground-floor windows should be eliminated.
- Windows that open should not have crank and worm-gear openers.
- Windows should not be located in exterior play or gathering areas.
- Windows placed at the ends of hallways are especially susceptible to damage by objects thrown or kicked down the hall.
- Window sash size should be limited to 6 square feet.
- Window frames should be installed with putty on the interior.
- Lexan, polycarbonate, fiberglass, and other hard, scratch-resistant coatings are being used for windows. These are, however, more expensive than glass, are easy to scratch, and are vulnerable to burning.
- Break-proof plastic windows are being used to cut property loss.
- No breakable glazing should be used on any windows. Extruded aluminum glazing stops and mounting tapes or pop rivets should be used. Construction sealants are better than glazing putty.
- Where constant window breakage is experienced, wire mesh security screens or grillwork can be used. Grillwork, if carefully designed, can be attractive and not convey a prisonlike atmosphere. Many fire codes limit the use of wire mesh. Check building codes prior to installation.

- It is extremely important that broken windows be repaired as soon as the vandalism is noticed. This removes the perpetrators' handiwork from display and discourages future damage.
- Sliding windows and casement windows should be avoided; significant security problems are associated with them.

Visibility

- Unobstructed views are desirable for all areas.
- Clear visibility at the main entry is a necessity.
- Athletic areas should be entirely visible from key locations.
- Bushes against buildings should be kept low.
- Trees should have lower limbs removed.
- Shrubs should be limited to low ground cover.
- Access points should be well-lighted when in use.
- The school site should be visible through landscaping.
- The school should be visible from neighboring homes and businesses.
- Entries, loading docks, administrative offices, windows, and skylights should be visible from the street or protected by special means.
- Blind spots provided by doorways, fences, support buildings, and landscaping should be minimized.

Traffic patterns and parking areas

- Vehicles and pedestrians should be separated.
- Parking areas should be visible for supervision purposes and not convenient for racing.
- The interiors of bus shelters should be visible.
- Plans should provide for a perimeter emergency lane.
- Parking lots should be small to reduce vandalism.
- It may be advisable to mix faculty and student parking. Designating a parking lot as "Faculty Only" can make cars parked in these lots targets for theft and abuse.
- A specific area should be designated for motorcycle parking.
- Students should not have unlimited access to their cars during school hours. Entries and exits should be provided with strong, lockable gates. A separate lot could be provided for students who require unusual access times. All areas should be properly identified with signs and appropriate regulations.
- Gates and removable bollards can be used to restrict unwanted traffic from walks and driveways. Gates must be

constructed of heavy-duty materials with the main cross-bar above bumper height to discourage forced entry by cars.

- Location of parking lots should allow for easy, direct, visual observation.

Play and sports areas

- Open expanses of grass, cinder tracks, and tennis courts attract automobiles and motorcycles. Spinning tires dig deep ruts in grass, chew up tracks, and leave skid marks. Vehicles leave oil droppings on paved areas. Vehicular access to these areas should be restricted or eliminated.
- Playgrounds should be planned with separate areas of activity to keep vehicles out of sports and play areas and to restrict entry to other unauthorized areas. Retaining walls, landscaping, and steep slopes or berms are often used; but probably the most common and practical method of achieving separation is with chain-link fencing.-
- Playgrounds should be fenced off from the main school building so the school building areas are off-limits during all nonschool hours.
- Consideration should be given to eliminating student "hang-out" areas. These areas are often cluttered with litter, are subject to wear, and provide opportunities for graffiti application. They harbor smoking, drinking, and drug use and can provide settings for conflicts or assaults.
- Consideration should also be given to bicycle racks; bicycles are targets for theft and vandalism. Bicycle parking areas should be securable and monitored.
- Playground equipment should be located to afford good visual surveillance by school staff, neighbors, or police patrols.
- Playground equipment should be durable, constructed with a minimum of parts, and equipped with tamper-proof fasteners and set screws or tack welds on bolts. Wood should be treated with fire-retardant material.
- One of the most rewarding and satisfying ways to create a playground is to let students, parents, and school staff design and construct it.
- Drinking fountains are a natural source of horseplay. They should be recessed into exterior walls rather than free-standing.

Landscaping

- Trees should be kept at least 10 feet from buildings to prevent window and roof access.
- Trees should be trimmed to permit cross-campus visibility. All trees should be sturdy enough to withstand being climbed 8 or 9 feet above ground.
- Shrub planting should be done in large masses. Groupings are less attractive to abuse than single shrubs.
- Shrubs with tough, flexible stems and limbs are best.
- Shrubs should attain mature heights of no more than 2 to 4 feet.
- Paving and good ground cover should be used for the entire site.
- Prickly plantings should be placed next to walks and buildings to channel pedestrian traffic (some nursery associations can provide recommendations for plants that are suitable for crime prevention purposes).

Fencing and gates

- Fencing or gates, except for special areas such as utility locations and athletic fields, should be used with discretion. If used, chain-link fencing should be the primary material to maintain visibility.
- High perimeter fencing with gates should be placed around all construction sites near existing facilities and at all walks and drives.
- Gates should have heavy-duty padlocks.
- Gate locks throughout a school district should use common keys that will permit security personnel, firefighters, and maintenance workers to enter with minimal delay.
- Whenever possible, fencing should be concealed in landscaping.

Exterior lighting

- Break-resistant lenses should be used.
- All wall-mounted or free-standing lights should be placed a minimum of 12 to 14 feet from the ground. The light standards should be constructed of either galvanized steel or concrete.
- The decision to use lights or some other security measure to protect buildings, school drives, walkways, and parking lots is

one that each school district will need to discuss. Alternatives include using an intrusion-activation system that turns on lights; having law enforcement officers occupy the school at night to do their reports; or maintaining a school security police force that actively patrols the area.

- If lighting is used, it should be directed at the facility if the building is to be patrolled from the exterior, or directed to illuminate the grounds around the facility if the building is to be patrolled from within.
- Potential points of access into the building, such as the main entrance, side entrances, and delivery entrances, should have increased levels of illumination. There should be automatic controls for light fixtures.
- Lights should reduce shadow areas and provide nonglare light.

Note: Some schools have found that spotlights and school lighting have not proven effective in protecting property. These schools report initial success in having a lights-out policy after hours. Typically, these schools are on a central alarm and lighting system (monitored by the school district) so that lights can be automatically switched on when disturbances are detected or when police arrive.

Lavatories

Lavatories should reflect respect for the needs of people for privacy. Instead they are often sites of intimidation and violence against students, primarily because they are undersupervised. The California Department of Parks and Recreation started eliminating group facilities many years ago, with subsequent reductions in vandalism and terrorism. Their newer design focuses on a single-user cubicle with doors that open directly to a public space. Another solution might be to place lavatories in each classroom. The bottom line is that lavatories would be safer if they did not provide a social gathering place for students. The following design considerations may be of value for schools with group facilities:

- Washrooms should be designed to be cleaned with a high-pressure hose (formed corners; no joints, and so forth).
- Toilet partitions and their doors will be more vandal resistant if they are constructed of laminated plastic that is a mixed dark color.
- Damage to piping can be reduced by concealing it as much as possible in a pipe chase.

- Concealed and automatic flush valves should be used.
- Use of tank-type flushing devices should be avoided.
- Alternatives to plate glass mirrors are available; avoid using windows for ventilation. Bottoms of doors can be fitted with grills, if codes allow.

Environmental design features

- An institutional appearance should be avoided. Select tasteful finish textures and colors.
- There should be a minimum of ornate nonfunctional building decoration in order to reduce replacement costs.
- Portable buildings should be placed so that supervision is easy and blind areas are avoided.
- There should be a decentralization of administrative and other offices.
- Walls should be a designed to prevent roof access.
- Wall-mounted fixtures should be flush or recessed to eliminate handholds for climbing.
- Restroom design should provide an environment that people will respect.
- Walls should be 12 feet high and made of mar-resistant materials.
- Roofs should be made of fire-resistant or retardant material.
- Halls, stairwells, and corridors should be designed to provide high visibility.
- Half-walls or free-standing walls should be eliminated.
- Roof and skylight design should not provide easy access to buildings; access should be limited by securing exposed drains, window frames, stored items, decorative ledges, vehicles, and anything else a person might grasp or climb onto.
- Walkway cover near second-floor windows should be limited.
- Instead of free-standing directional signs, consider signs painted on the curb or street.
- Dumpsters should be placed far enough away from buildings so that they do not serve as ladders to upper floors or roofs.
- Meters, transformers, valves, and other mechanical or electrical devices should be placed in lockable, recessed vaults or within buildings.
- Physical barriers that limit access for handicapped persons should be eliminated.
- Flagpoles should be mounted on roofs or have nylon-covered wire halyards and lockable cover boxes for halyard cleats.

- Artwork that can stand use should be chosen.
- School grounds should be kept free of gravel or rock surfaces.

Visitor control and access

- The entry and movement of persons on school grounds and within school buildings should be controlled and supervised.
- All regulations should be in writing.
- One entrance should be designated for all persons coming onto the campus during school hours. This information should be clearly posted and the requirement enforced at each entrance.
- A monitoring sheet for signing in and out should be kept daily.
- In large schools, the use of ID cards or other identification is recommended. IDs should be checked regularly.
- Visitors not admitted by the above process are unauthorized and should be dealt with accordingly.

Specialized sites

Many school districts operate specialized sites such as discipline centers, storefront schools, training labs, classrooms in malls, and storage barns for equipment and food services. Each of these specialized sites should be considered in the overall safety design, and planners should ask themselves these questions:

- Is there an accurate map of the facilities at the school district office?
- Do the teachers and staff at the sites have two-way communications capability with the central office or to the security force?
- Is there a video monitor or other device installed?
- Are there security checks?
- Do police and fire personnel know the location of these sites, their layouts, and the number of personnel assigned to each?

Selected Resources

This list contains three sections: publications, videotapes and electronic media, and the addresses of resource centers.

Publications

Between a Rock and a Hard Place (Law for school administrators). Foster City: California School Law Publishers, 1995.

Biblio Alert! New Resources for Prevention of Injury and Violence. Arlington, Va.: Children's Safety Network, National Center for Education in Maternal and Child Health, 1993.

Boyer, Ernest L. "Civic Education for Responsible Citizens." *Educational Leadership*, Vol. 48 (November, 1990), pp. 3–7.

California Laws Relating to Minors. Los Angeles: Legal Books Distributing, 1995.

Child Abuse: The Educator's Responsibility (Revised edition). Sacramento: Office of the California Attorney General, Crime and Violence Prevention Center, 1995.

Child Abuse Prevention Handbook (Revised edition). Sacramento: Office of the California Attorney General, Crime Prevention Center, 1994.

Child Safety Curriculum Standards. Westlake Village, Calif.: National School Safety Center, 1992.

Community Oriented Policing and Problem Solving. Sacramento: California Department of Justice, Attorney General's Crime Prevention Center, 1992.

Comprehensive Strategy for Serious, Violent, and Chronic Juvenile Offenders: Program Summary. Rockville, Md.: Office of Juvenile Justice and Delinquency Prevention, 1994.

Crack Down on Gangs! Sacramento: California Department of Justice, Attorney General's Crime Prevention Center, 1991.

Crime Prevention Through Environmental Design Program. Pepperdine University, Malibu, Calif.: National School Safety Center, 1994.

Criminal Victimization. Washington, D.C.: U.S. Department of Justice, Bureau of Justice Statistics, 1992.

DeJong, William. *Preventing Interpersonal Violence Among Youths: An Introduction to School, Community, and Mass Media Strategies*. Cambridge, Mass.: Harvard School of Public Health, 1994. Available from the National Criminal Justice Reference Service (see Resource Centers section).

Developing Personal and Social Responsibility. Westlake Village, Calif.: National School Safety Center, 1992.

Drugs and Youth: An Information Guide for Parents and Educators. Sacramento: California Department of Justice, Attorney General's Crime Prevention Center, 1991.

Educated Public Relations: School Safety 101. Westlake Village, Calif.: National School Safety Center, 1986.

Family Life, Delinquency, and Crime: A Policymaker's Guide (Research summary). Rockville, Md.: Office of Juvenile Justice and Delinquency Prevention, 1994.

Family Violence: Prevention and Treatment. Edited by Robert L. Hampton and others. Thousand Oaks, Calif.: Sage Publications, Inc., 1993.

Fingerhut, Lois A. "Firearm Mortality Among Children, Youth, and Young Adults 1–34 Years of Age, Trends and Current Status: United States, 1985–90," *Advance Data from Vital and Health Statistics*, Vol. 231 (March 23, 1993).

Freedom from Fear: Ending California's Hate Violence Epidemic. Final Report of the Lieutenant Governor's Commission on the Prevention of Hate Violence. Sacramento: Office of the Lieutenant Governor of California, (January, 1993).

From Chaos to Control: School Crisis Response. Orange County, Calif.: California County Superintendents Educational Services Association, 1994.

The Future by Design. A Community Framework: Preventing Alcohol and Other Drug Problems Through a Systems Approach. Washington, D.C.: U.S. Department of Health and Human Services, Center for Substance Abuse Prevention, 1991.

Gangs: A Community Response. Sacramento: Office of the California Attorney General, Crime and Violence Prevention Center, 1994.

Gangs in Schools: Breaking Up Is Hard to Do. Westlake Village, Calif.: National School Safety Center, 1993.

Growing Up Drug Free: A Parent's Guide to Prevention. Washington, D.C.: U.S. Department of Education, 1990.

Handbook on the Rights and Responsibilities of School Personnel and Students in the Areas of Providing Moral, Civic, and Ethical Education, Teaching About Religion, and Promoting Responsible Attitudes and Behaviors and Preventing and Responding to Hate Violence (Updated and revised edition). Sacramento: California Department of Education, 1995.

Journal of Emotional and Behavioral Problems: Reclaiming Children and Youth. Bloomington, Ind.: National Educational Service, n.d.

Law in the School (Revised edition). Sacramento: Office of the California Attorney General, Crime and Violence Prevention Center, 1994.

Learning to Live Drug Free: A Curriculum Model for Prevention. Washington, D.C.: U.S. Department of Education, 1990.

Legal References for California School Administrators: Olathe, Kan.: School Administrators' Publishing Company, 1995.

Not Schools Alone: Guidelines for Schools and Communities to Prevent the Use of Tobacco, Alcohol, and other Drugs Among Children and Youth. Sacramento: California Department of Education, 1991.

On Alert! Gang Prevention: School In-service Guidelines. Sacramento: California Department of Education, 1994.

Preventing Chaos in Times of Crisis: A Guide for School Administrators. Los Alamitos, Calif.: Southwest Regional Laboratory, 1992.

The Prevention of Youth Violence: A Framework for Community Action. Atlanta: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention, 1993.

Prevention Plus II: Tools for Creating and Sustaining a Drug-Free Community. Washington, D.C.: U.S. Department of Health and Human Services, Center for Substance Abuse Prevention, 1991.

Prevention Plus III: Assessing Alcohol and Other Prevention Programs at the Community Level. Washington, D.C.: U.S. Department of Health and Human Services, Center for Substance Abuse Prevention, 1989.

Prevention Resources Guide: Elementary Youth. Washington, D.C.: U.S. Department of Health and Human Services, Center for Substance Abuse Prevention, 1991.

Prevention Resources Guide: Preschool Children. Washington, D.C.: U.S. Department of Health and Human Services, Center for Substance Abuse Prevention, 1990.

Prevention Resource Guide: Secondary School Students. Washington, D.C.: U.S. Department of Health and Human Services, Center for Substance Abuse Prevention, 1991.

Prothrow-Stith, Deborah. *Deadly Consequences: How Violence Is Destroying Our Teenage Population and a Plan to Begin Solving the Problem.* New York: HarperCollins, 1993.

Safe Schools: A Planning Guide for Action (Revised edition). Sacramento: California Department of Education, 1995.

School/Community Violence Prevention: Focus on Gangs. Sacramento: California Department of Education and California Attorney General's Office, 1993.

School Crime. Washington, D.C.: U.S. Department of Justice, Bureau of Justice Statistics, 1991.

School Crime and Violence: Victims' Rights. Westlake Village, Calif.: National School Safety Center, 1992.

School Discipline Notebook (Revised edition). Westlake Village, Calif.: National School Safety Center, 1992.

School-Police Procedural Handbook. Menlo Park, Calif.: Menlo Park Police Department, 1990.

School Safety Checkbook. Westlake Village, Calif.: National School Safety Center, 1990.

Schools and Drugs: A Guide to Drug and Alcohol Abuse Prevention Curricula and Programs. Sacramento: California Attorney General's Crime and Violence Prevention Center, 1991.

Student Searches and the Law. Malibu, Calif.: National School Safety Center, Pepperdine University, 1995.

Summary of Laws Pertaining to School Disorder: A Guideline for School Officials. San Diego, Calif.: San Diego City Schools Police Department, 1992-93.

Toward a Drug-Free Generation: A Nation's Responsibility. Washington, D.C.: U.S. Department of Education and Office of National Drug Control Policy, 1990.

What Works: Schools Without Drugs. Washington, D.C.: U.S. Department of Education, 1992.

"When Killers Come to Class," *U.S. News and World Report*. November 8, 1993.

Youth Involvement: Developing Leaders and Strengthening Communities. Washington, D.C.: U.S. Department of Housing and Urban Development, Partners for Youth Leadership, and the Office of Public and Indian Housing, 1990.

Videotapes and electronic media

Chaos to Calm . . . Creating Safe Schools (Videotape). Sacramento: Office of the California Attorney General, Crime and Violence Prevention Center, 1984.

Community-Oriented Policing and Problem Solving (Videotape and guide). Sacramento: Office of the California Attorney General, Crime and Violence Prevention Center, 1992.

Drug Free Zones . . . Taking Action (Videotape). Sacramento: Office of the California Attorney General, Crime and Violence Prevention Center, 1991.

Drugs and Youth . . . The Challenge (Videotape, revised version). Sacramento: Office of the California Attorney General, Crime and Violence Prevention Center, 1991.

Gamut—School Board Policies and Procedures (CD-ROM). Sacramento: California School Boards Association. (This CD-ROM includes sample policies and procedures on issues currently facing California schools.)

Gangs—Turning the Corner (Videotape). Sacramento: Office of the California Attorney General, Crime and Violence Prevention Center, 1994.

Raising Children in Troubled Times (Videotape). Los Angeles: Los Angeles Unified School District, 1992. A video series to help parents deal successfully with the supervision and discipline of children; sets available in English and Spanish.

Safe Schools: A Guide for Action (Videotape). Sacramento: Office of the California Attorney General, Crime and Violence Prevention Center, 1984.

School Crisis: Under Control (Videotape). Westlake Village, Calif.: National School Safety Center, 1991.

Resource centers

California Attorney General's Crime and Violence Prevention Center, P.O. Box 944255, Sacramento, CA 94244-2550; telephone (916) 324-7863 or fax (916) 327-2384.

California County Departments of Education, Risk Management Services. Call you county office of education.

California Department of Education, School Facilities Planning Division, 560 J Street, Suite 165, Sacramento, CA 95814; telephone (916) 322-2470 or fax (916) 327-3954.

California Department of Education, School Safety and Violence Prevention Office, P.O. Box 944272, Sacramento, CA 94244-2720; telephone (916) 657-2989 or fax (916) 657-5263.

California School Boards Association, 3100 Beacon Boulevard, P.O. Box 1660, West Sacramento, CA 95691; telephone (916) 371-4691.

Children's Safety Network, National Center for Education in Maternal and Child Health, 2000 15th Street North, Suite 701, Arlington, VA 22201-2617.

Conflict Resolution Resources for School and Youth, Community Board Program, Inc., Suite 490, 1540 Market Street, San Francisco, CA 94102-1250; telephone (415) 552-1250.

Constitutional Rights Foundation, 601 South Kingsley Drive, Los Angeles, CA 90005; telephone (213) 487-5590; and 407 South Dearborn Street, Suite 1700, Chicago, IL 60605; telephone (312) 663-9057.

Division of the State Architect, State of California, 400 P Street, 5th Floor, Sacramento, CA 95814; telephone (916) 445-2163 or fax (916) 445-3521.

Drug Information and Strategy Clearinghouse, P.O. Box 6424, Rockville, MD 20850; telephone (800) 955-2232.

Drugs and Crime Data Center and Clearinghouse, 1600 Research Boulevard, Rockville, MD 20850; telephone (800) 666-3332.

Juvenile Justice Clearinghouse, 1600 Research Boulevard, Rockville, MD 20850; telephone (800) 638-8736 or electronic bulletin board (301) 738-8895.

Law Advisory Group, 2512 Ashurst Road, University Heights, OH 44118; telephone (216) 371-0212.

National Clearinghouse for Alcohol and Drug Information, Box 2345, Rockville, MD 20852; telephone (800) 729-6686.

National Criminal Justice Reference Service, P.O. Box 6000, Rockville, MD 20850; telephone (800) 851-3420.

National Educational Service, 1610 West Third Street, P.O. Box 8, Bloomington, IN 47402; telephone (812) 336-7700.

National School Safety Center, 4165 Thousand Oaks Boulevard, Suite 290, Westlake Village, CA 91362; telephone (805) 373-9977 or fax (805) 373-9277.

Office of Criminal Justice Planning, 1130 K Street, Suite 300, Sacramento, CA 95814; telephone (916) 327-8706 or fax (916) 324-9167.

U.S. Department of Education, Office of Elementary and Secondary Education, Drug Planning and Outreach Unit, 400 Maryland Avenue S.W., Washington, DC 20202; telephone (800) 788-2800.

Standards for School Lighting

The goal of lighting for educational facilities, as outlined in summary by the Illuminating Engineering Society of North America, is to provide in each school a visual environment for both student and instructor that is supportive of the learning process. This environment can be achieved only if the occupants can see their visual tasks accurately, quickly, and comfortably. Uniformity of illuminance throughout an educational facility does not ensure a high level of visual performance because of the great variety of visual tasks engaged in. These visual tasks become more varied as students move from the elementary school through high school and on to college or other vocational pursuits.

Lighting must also be visually comfortable and be responsive to the psychological and emotional needs of learners. Lighting can make a school more pleasant and attractive, reinforce feelings of spaciousness, delineate areas of differing functions, stimulate learning, and improve behavior.

Research-Based Design Recommendations

Recent research has shown that conclusions about losses of visual accuracy because of extremes of luminance are based on average luminance and the light-source location in relation to the viewer rather than on the maximum luminance of any specific square inch, except in extreme cases. Small bright areas apparently do not appreciably interfere with vision or comfort unless the luminance in such areas exceeds by three or four times the average

room luminance. For the purpose of avoiding undesirable luminance differences, most interior surfaces should be finished with material of high reflectance. White ceilings with 80 percent reflectance are essential. The upper wall surfaces should be white if possible. If it is desirable to introduce a color, the color should be one of high reflectance. The use of reflectances as high as 80 percent is recommended so that upper walls can be effectively used. However, no large areas of wall at heights of less than 7 feet should have reflectances exceeding 50 percent. High reflectance in such areas provides a background that renders faces and objects less bright than the wall and therefore reduces visibility. It is also a potential source of glare. Small areas of chalkboard—less than 10 feet in length—will create no serious loss of luminance even if the chalkboard's reflectance is less than 25 percent, but a higher value is more desirable from a comfort standpoint. Tackboards, unlike chalkboards, need not be of low reflectance and should approach the reflectance of the adjacent walls. Colors and textures should be selected by the architect or interior designer to produce an aesthetically pleasing environment. This goal should and can be met while maintaining reasonably high reflectance so that wide luminance differences are avoided between light-colored tasks on the desk and the visually adjacent area of the floor.

Some design considerations also are applicable to systems using daylight as the prime light source. The concern for the conservation of energy in this country has served to bring daylight back as an energy source for interior lighting design. If natural light is used, it must meet the same fundamental requirements applied to electric light sources. Objectionable glare, poor light distributions, and a general imbalance in the visual environment should be prevented.

To ensure the proper use of materials, colors, and lighting systems, the architect and/or the consulting engineer should be involved in the preliminary design phases of the building or in the modernization or reconstruction project. Also, the district should incorporate a request for these services in the contractual or written instructions to the project architect. As the preliminary design phases of the plan progress, the architect and the consulting engineer should involve school district personnel in discussions of proposed solutions for problems in the design of lighting systems.

Suggestions

Basic factors, or modifiers, that may improve or reduce the quality and quantity of a lighting system, and the characteristics that make for the best possible lighting system, are as follows:

1. **Reflectances**
   a. Ceilings should be white or light colored, with a reflectance of 80 percent or higher.
   b. Walls should be white or light colored. Their reflectance should be 80 percent or higher above 7 feet and about 50 percent below 7 feet. The average reflectance for the total wall should be about 70 percent.
   c. Floors should have a minimum reflectance of 25 percent. A higher reflectance is very desirable, however.

2. **Fixture brightness**
   a. In a large room, the lighting fixtures should be recessed, or the ceiling and lighting system should be designed so that the fixture brightness is not high at angles close to the line of sight.
   b. The brightness of the fixtures should be kept low. In a standard 2-by-4-foot fluorescent fixture, use of more than two tubes will result in a fixture brightness that is too high.
   c. Light sources, such as a window or the diffuser of a direct luminaire fixture, should have an average brightness that does not exceed five times the brightness of the student's task. Large source areas of brightness, such as the reflective ceiling above an indirect fixture of a ceiling system with 50 percent or more of the total area in luminaires, should not exceed three times the brightness required. Visual comfort probability (VCP) is 85 or more.

3. **Ceiling height**

   With a standard recessed ceiling fluorescent fixture, a ceiling height of 12 feet is usually better than a ceiling height of 8 feet because the extra height allows for (1) more wall areas for reflectance and, thus, more even distribution of light; and (2) increased comfort because the fixtures are farther from the line of sight. The additional wall areas may have light reflectance of 80 percent or higher.

4. **Excess wall luminance (windows)**

   a. Window treatment must be such that no direct sunlight falls on the work plane.

   b. Window treatment should allow the entrance of only that amount of daylight necessary to achieve the lighting goals. Excess amounts of daylight cause glare and heat gain.

   c. Where feasible, windows should be provided and located for outside viewing. (Windows with a minimum width of 12 feet and a maximum sill height of 32 inches are recommended.) View windows also serve as emergency exists where possible.

5. **Nonuniformity of illumination (general lighting)**

   a. The fixture type that is selected and the layout should be compatible with the room design and configuration.

   b. The fixtures should be of such design and manufacture and located at a height such that each fixture produces an even pattern of light within its area.

   c. The fixtures should be arranged in a pattern or array that provides for even distribution of the total light throughout the room.

   d. "Accent" and "effect" lighting should be kept to an absolute minimum.

6. **Energy conservation concepts**

   a. *Screening*. Direct sunlight, the brightness of the sky, snow glare, and other sources of extreme brightness should be screened from building interiors by glare-reducing glass, building overhangs, or other cutoff devices. Maximum brightness from exterior sources should not exceed 300 footlamberts (1,028 candelas per square metre).

   b. *Lighting*. Lumens per watt should be kept high in comparison with the output of currently available fixtures, and wattage per square foot should be kept low.

   c. *Natural light*. When provided, natural light is considered an "energy trade-off," with consequent increases of inefficiencies in heating, ventilating, or air-cooling systems. Natural light is considered suitable for corridors, toilets, showers, lockers, and storage and service areas.

d. *Localized control.* Localized switching should be provided for approximately each 250 square feet of instructional areas. In areas that receive natural light, localized switching should also be provided. All interior lighting, except emergency and night-lights, should be controlled by a time clock. All exterior lighting should be controlled by photosensors.

e. *Heat.* Heat generated by light fixtures should be considered in the overall design and should be directly exhausted when not needed or should be recovered for future use.

Glossary

Candela (cd). An international unit of luminous intensity.

Candlepower (cp). A measure of the intensity of emitted light in a given direction.

Coefficient of utilization. The ratio of the luminous flux (lumens) from a luminaire received on the work plane to the lumens emitted by the luminaire's lamps alone.

Contrast rendition. A measure of the extent to which the contrast between the dark and light portions of a task is maintained by the lighting system.

Diffuser. A lens or cover of a luminaire fixture that scatters light evenly in all directions.

Equivalent sphere illuminance (ESI). The effectiveness of a lighting system in rendering contrast, expressed as the amount of illumination required from a uniform hemispherical lighting system to produce the same visibility of the task as does the lighting system being investigated.

Evr. Total illumination from the veiling reflection (glare) zone.

Floor cavity. The space between the work plane and the floor.

Footcandle (fc). A measure of the amount of illumination on a surface.

Footlambert (fl). A measure of the luminance (brightness) of a surface.

Interreflected flux. Light that falls on a surface after first being reflected one or more times from surfaces within the room. All light on a surface except that which comes directly from luminaries.

Lumen. A unit of light.

Luminaire. A light fixture.

Luminance. The intensity of light emitted or reflected from a surface in a given direction per unit area of the surface. Commonly called "brightness."

Lux. A unit of illumination equal to the direct illumination on a surface that is everywhere 1 metre from a uniform light source of 1 candle or equal to 1 lumen per square metre.

Reflectance. The ratio of light reflected from a surface to that falling on the same surface, usually expressed as a percent.

Room cavity. The space between the work plane and the mounting height of the luminaires.

RVC. Relative visual comfort.

Specular. A type of reflectance in which light rays are reflected in the manner of a mirror, as opposed to a "diffuse" type of reflectance, in which light is scattered evenly in all directions.

Task luminance. The average or overall luminance required for a selected task. For pencil on paper, the standard task luminance is computed on the basis of an assumed 70 percent task reflectance.

Transmittance. The ratio of light transmitted through a panel to that falling on it. Usually expressed as a percent.

VCP. Visual comfort probability. A rating that indicates the percent of people who would be comfortable working under a given lighting installation.

Veiling reflections. Reflections from the surface of an object or tasks that partially obscure the details, thus reducing the contrast.

Contacts and Resources

California Department of Education
School Facilities Planning Division
560 J Street, Suite 165
Sacramento, CA 95814
(916) 322-2470

California Department of General Services
Office of Energy Assessments
717 K Street, Suite 409
Sacramento, CA 95814
Contact Lynn Wiley
(916) 324-1284

Clean Schools Standards

Promoting School and Community Pride

Promoting school and community pride in school facilities through a program of cleanliness and maintenance has far greater significance than just pleasing the public. A clean and well-maintained school facility promotes a favorable community attitude and helps develop respect for school property. In addition, a well-kept school contributes to the health, happiness, and character development of its students. Cleanliness and good maintenance thus become factors in the preservation of the school plant. An unkempt appearance and inadequate school maintenance frequently breed students' contempt for the property. This contempt is often expressed in misuse of restrooms; in littering; in defacement of walls, furniture, and equipment; and through other forms of vandalism. On the other hand, a clean, well-maintained campus can create an atmosphere in which students, staff members, parents, citizens, and governing board members can take pride in their schools. A good maintenance program and a clean campus have implications for improved public relations and for fiscal management as well. The public is gratified to know that the governing board has developed policies that preserve school property. This positive public and student attitude is often demonstrated by financial support and by the pride with which the facilities are shown to visitors.

Effecting a program that fosters these conditions requires an established board policy that ensures that the desired practices and

procedures leading to a clean, well-maintained campus will be functional.

When establishing policies for a maintenance and operations program and in evaluating existing programs, the governing board and the administration should answer the following questions:

- Do governing board policies include standards for the necessary services?
- Is meeting the needs of the district's educational program the primary objective of the maintenance and operations program?
- Does the building program provide energy-efficient sites with adequate storage space, work-stations, and other necessary service facilities?
- Does the building program reflect the importance of selecting material and equipment that contribute to efficient custodial operations as well as to low maintenance costs?
- When district standards for furnishing classrooms are established, does allocated space facilitate custodial work within the classroom?
- Does the district budget provide the necessary funds to carry on a detailed, carefully planned program of maintenance and operations services?
- Do annual budgets provide adequately for depreciation and replacement as well as for original purchases of maintenance and operations equipment?
- Have the maintenance and operations service functions been included and have personnel been sufficiently trained and involved in developing and operating the district's safety and security program?
- Does the district's educational program encourage students to respect school facilities?
- Are the written rules and regulations regarding the use of school facilities by community groups effectively enforced so as not to cause undue custodial problems?

These questions, thoughtfully considered by the governing board members, can be a starting point toward maintaining the district's facilities.

Standards for the appearance and function of school facilities reflect the governing board's interpretation of the wishes of the taxpaying community regarding the schools that community supports. The board is responsible for formulating policies that

clarify the standards necessary to design, construct, equip, maintain, and operate the physical plant; finance these operations; and ensure that these policies are implemented.

Contact and Resources

California Department of Education
School Facilities Planning Division
560 J Street, Suite 165
Sacramento, CA 95814
(916) 322-2470

Publications

Administration of Maintenance and Operations in California School Districts. Sacramento: California Department of Education, 1986.

A Complete Guide to Building and Plant Maintenance (Second edition). Englewood Cliffs, N.J.: Prentice-Hall, n.d.

Housekeeping Handbook for Institutions. New York: Fredrick Fell Publishers, n.d.

The New Good School Maintenance. Springfield: Illinois Association of School Boards, n.d.

Technology Resources Available on Internet Web Pages

The Department has established a web page that guides Challenge Districts to a wide array of technological resources that are available through the Internet. These resources are organized into areas that personnel in Challenge Districts have indicated are of particular interest. The areas include comprehensive technology planning, integration of technology into the curriculum, and staff development. District personnel may request additional subject areas to be added to this web site. If you have suggestions or comments, please contact David Patterson at dpatters@cde.ca.gov.

In addition to the resources described in the following sections, the reader might also investigate The Dilbert Zone at http://www.unitedmedia.com/comics/dilbert/. Improving schools and changing bureaucracy is hard work. Dilbert provides some comic relief. The comic strip changes daily; make it your home page so you can read it at the beginning of the day. You will be amazed at how often it hits home.

Comprehensive Technology Planning

- **California Department of Education Network Planning Guide**
  http://goldmine.cde.ca.gov/WWW/Technology/K-12/NTPG/NTPG.html
  This page offers the Department's network planning guide in a plain text document that can be downloaded. It also includes a large number of links to other education-related web sites around the country.

- **International Society for Technology in Education (ISTE)**
  http://isteonline.uoregon.edu/
  ISTE is the largest international organization dedicated to improving education through technology. This site provides a guide to resources and a link to news on technology in education that contains information on current projects. One such project, The Road Ahead, provides grants and training in the use of technology for 22 teams of public school teachers, administrators, and community organization leaders.

- **Reinventing Schools: The Technology Is Now**
  http://www.nap.edu/nap/online/techgap/welcome.html
  Navigate through this site to learn about networking K-12 education, the government's role in supporting technology, technical information, and multimedia exhibits. Download or listen on the net (depending on the browser) to audio interviews of the authors on these subjects.

Integration of Technology into the Curriculum

- **California Instructional Technology Clearinghouse**
  http://tic.stan-co.k12.ca.us/q/@003256gizrft/satsite.html
  The Clearinghouse contains reviews and information about much educational software available today. Its search capacity can be used to check the ratings given to specific programs or to create lists of the highly rated software in the subject area you are interested in.

- **Public Broadcasting System Online**
  http://www.pbs.org/
  This site contains a large array of information about PBS educational shows and related Internet-based projects. There are sections included for both the adult and the child. It also offers the choice of text or graphical user interface.

- **The Annenberg/CPB Math and Science Project**
  http://www.learner.org/k12
  The Guide to Math and Science Reform
  The Annenberg/CPB Math and Science Project web site has over 950 entries with descriptions of organizations and their projects aimed at improving instruction in science and mathematics in kindergarten through grade 12.

- **Center for Educational Leadership and Technology, Inc.**
  http://www.celt.org/
  Use this site to obtain information on technology in schools, current projects, and multimedia presentations and materials.

- **Edu-Tech**
  http://www.csv.warwick.ac.uk/WWW/edu-tech/
  Edu-Tech has information about initiatives (computers in teaching), programs (teaching and learning technology), and resources (multimedia, and computer-aided web pages).

- **Computer-Using Educators (CUE)**
  http://www.cue.org/
  CUE is a California organization for K–12 educators. There is a useful list of links to technology in education at this site. Among the links are technology coordinators, technology-using administrators, global technology projects, and multimedia distance learning.

- **Education/Instructional Technology and Training**
  http://www.vahoo.com/
  An extensive collection of links to technology in education is available at this site. Included are projects, programs, video-based education, and tutorials for educators on how to use technology as a teaching device.

- **Global SchoolNet Foundation**
  http://www.gsn.org/
  Resources at this site enable children and adults to talk to people all over the world through video conferencing. Information is also provided about integrating the Internet into classrooms, and linking teachers and classrooms to resources and training and consulting services.

- **Far West Lab Educational Technology Program**
  http://www.fwl.org/
  Part of WestEd (formerly Far West Laboratories), this site provides information on the use of technology in the classroom and the development, implementation, and evaluation of educational technology.

- **CalTIP**
  http://www.sccoe.k12.ca.us/caltip
  This large site, sponsored by the California Department of Education, contains data on current school and district technology plans, grants and funding information for schools, instruction in grant writing, and directions for locating funding sources.

- **Terrell Technologies, Inc.**
  http://www.atlantic.net/~feedback/index.html
  This site's best feature is its downloadable educational software.

Staff Development

- **United States Department of Educational Leadership, Technology, and Human Development**
  http://www.gasou.edu/aix2/eltr/dept1.html
  Information on instructional technology, educational leadership, and foundations and research facilities is available at this site.

- **Institute for Information Age Education (IIAE)**
  http:users.aol.com/humerme1/iiae/IIAE home.html
  This site is devoted to a powerful, technology-immersion approach that empowers teachers to integrate multimedia programs and the Internet into their curriculum. There are many excerpts in which the real experiences of teachers who have used this method of teaching are shared.

- **Welcome to the Indata Group**
  http://www.indata.com/
  This is an educational site for researchers. A section for educators at this site has articles on educational technology and a list of other relevant web sites.

- **Educom**
  http://educom.edu/
  Educom represents a group of higher education institutions and is dedicated to "transforming education through information technology." Learn about initiatives and the goals of education coalitions. Call for conference and seminar proposals.

- NSF Educational Technology Workshop
  http://www.cc.gatech.edu/gvu/edtech/nsfws/
  This site has helpful information on designing technology for learners, classroom networks, and tools for authoring educational technology.

- DataServ, Inc.
  http://www.dserv.com/
  At this site, browsers can participate in discussions about technology and how it affects education.

- Educational Technologies: Context
  http://copernicus.bbn.com/edtech/contents.html
  Information is available here on the Advanced Technologies Learning Program (which creates educational tools and software), educational multimedia programs, and educational technology systems.